

# Lab class: Autonomous robotics

## General information

Institut für Neuroinformatik

August 15, 2018

### 1 Dates and places

**Preliminary meeting** August 16, 2018, 10:15–11:00am,  
seminar room (NB 3/57)

**Lab class** August 27-31, 2018, whole day 10:00am–open end,  
robotics lab (NB 02/77)

**Deadline for reports and source code** September 16, 2018, midnight,  
by email to Mathis Richter

### 2 Overview of the lab class

The lab class consists of seven problems that require programming a small robot to navigate different environments. You will be working with an actual physical e-puck robot,<sup>1</sup> not a simulation. The programming language is Matlab.<sup>2</sup>

You will work collaboratively in teams of two people (three people if need be). Your group is expected to work independently and solve problems on its own but there will be a tutor available to answer questions if you get stuck. You are also allowed and encouraged to talk amongst groups and discuss approaches on a conceptual level. Once you have solved a problem, you will present it to a tutor as a group. The tutor will go through the code with you, ask questions along the way and check whether your program solves the problem. All members of a team will have to understand the code and be ready to answer questions about it. If your program does not work or

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<sup>1</sup><http://www.e-puck.org>

<sup>2</sup><http://mathworks.com/products/matlab/>

something is missing, you will have to correct it. Otherwise, if everything is okay, you get a signature.

You will write two reports about the work in the lab course, which will be the basis of your final grade. This part is *not* team work—we expect entirely individual documents with individual text from each participant. Plots and figures created in the practical part of the lab class may be shared, but further illustrations must be done individually. Please refer to our guidelines when preparing the reports. You will hand in both the reports and the source code of your programs. In case you record any videos of your robots in action, we would love to see those as well, but they are not required.

### **3 Attendance**

Attendance at the preliminary meeting and all of the dates of the lab class is required to pass. If you cannot be present the entire time (e.g., because of an exam), please contact Mathis Richter *beforehand* to plan how you can regain the lost time.

### **4 Preparation**

In order to complete all problems within the week, you need to be prepared for the practical work. There will not be enough time to start reading while you solve the problems. We have prepared background material for the lab class, which contains the theoretical background and in depth explanation of the underlying problems. We expect you to read and understand the material before the lab class. Please plan enough time for going through this material. If you have questions about it, feel free to contact us even before the lab class starts. There will also be ample opportunity to ask questions about the background material during the lab class.

### **5 Work in the robotics lab**

For the duration of the lab class, you will receive a temporary account for a (Linux) computer in the robotics lab. We will assign computers and hand out user names and passwords on the first day of the lab class. You are required to use our computers for solving the robotic problems as they have been prepared for you to work with the hardware. Working on your own computer is not an option; neither is using an alternative programming framework such as ‘Freemat’.

To organize your code, please create a separate folder for each problem. This is to avoid issues that may arise when you have to modify code that you reuse from previous experiments. Using a separate folder for each allows you to preserve the code as it was when you solved the problem. Just copy the parts you want to reuse in the folder for the next experiment.

Feel free to also use our computers to work on your reports. We have L<sup>A</sup>T<sub>E</sub>X environments set up on every computer that you may use with the template we provide for the report.

*Please do not turn off the computers but only log out of your account to free the computer for other users.*

## 6 Grading and reports

The grade will be based on your reports. You will write two reports, each covering a set of programming problems. The first report covers problems 1.1 through 1.5 and will earn you up to 50 points. The second report covers problems 2.1 and 2.2 and will earn you another 50 points. This means that you can earn up to 100 points over the entire lab class. The points you earn over both reports are summed up and represent your final grade in percent. If a report for a problem is missing, you will receive zero points for that report. If you hand in a report but are missing a signature for having solved a problem, you will receive zero points for that report. If you cheat by copying program code from another group or from previous years, or if you copy text from another participant (even from within your group), or from other sources without proper citation, you will *fail the entire lab class*.

All reports have to be handed in two weeks after the lab class ends, at the latest: September 16, 2018, midnight. This is a hard deadline and will not be extended. If you hand in a report too late, you will receive zero points for that report.

For students of the study program ‘Angewandte Informatik’ we usually do not hand out certificates (German: Scheine) for the lab class. Instead, the grades will be forwarded to the examination office (German: Prüfungsamt) directly. For students of other programs, we can hand out certificates on demand. These can either have the achieved grade printed on them or simply state that you have passed the lab class. For the latter kind, you have to achieve at least 50 percent overall. Please inform us beforehand if you need a certificate and what kind you need.

## 7 Feedback for writing reports

We understand that most of you are not used to writing elaborate texts but it is a vital skill that you should not neglect. We would like to help you improve your writing and offer to give you feedback on your first report in a one-on-one meeting with one of our tutors. We strongly suggest that you take this opportunity but it is not required. The dates for feedback meetings will be scheduled individually during the lab class.

*Please note that in order to get feedback, you will have to hand in your report and you will not be able to change it after receiving feedback.* The feedback is meant to improve your scientific writing in general and for the future. Please do not hesitate to approach us about this if you have any questions.

## 8 Contact information

- General questions about the lab class:  
Mathis Richter  
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- Responsible for the lab class:  
Prof. Dr. Gregor Schöner  
gregor.schoener@ini.rub.de, 0234 32 27965, NB 3/31
- Tutors
  - Raul Grieben (raul.grieben@ini.rub.de, NB 02/74)
  - Rachid Ramadan (rachid.ramadan@ini.rub.de, NB 02/74)
  - Mathis Richter (see above)
  - Jan Tekülve (jan.tekuelve@ini.rub.de, NB 02/71)